The Accreditation Assistant
An Integrated VV&A Toolset

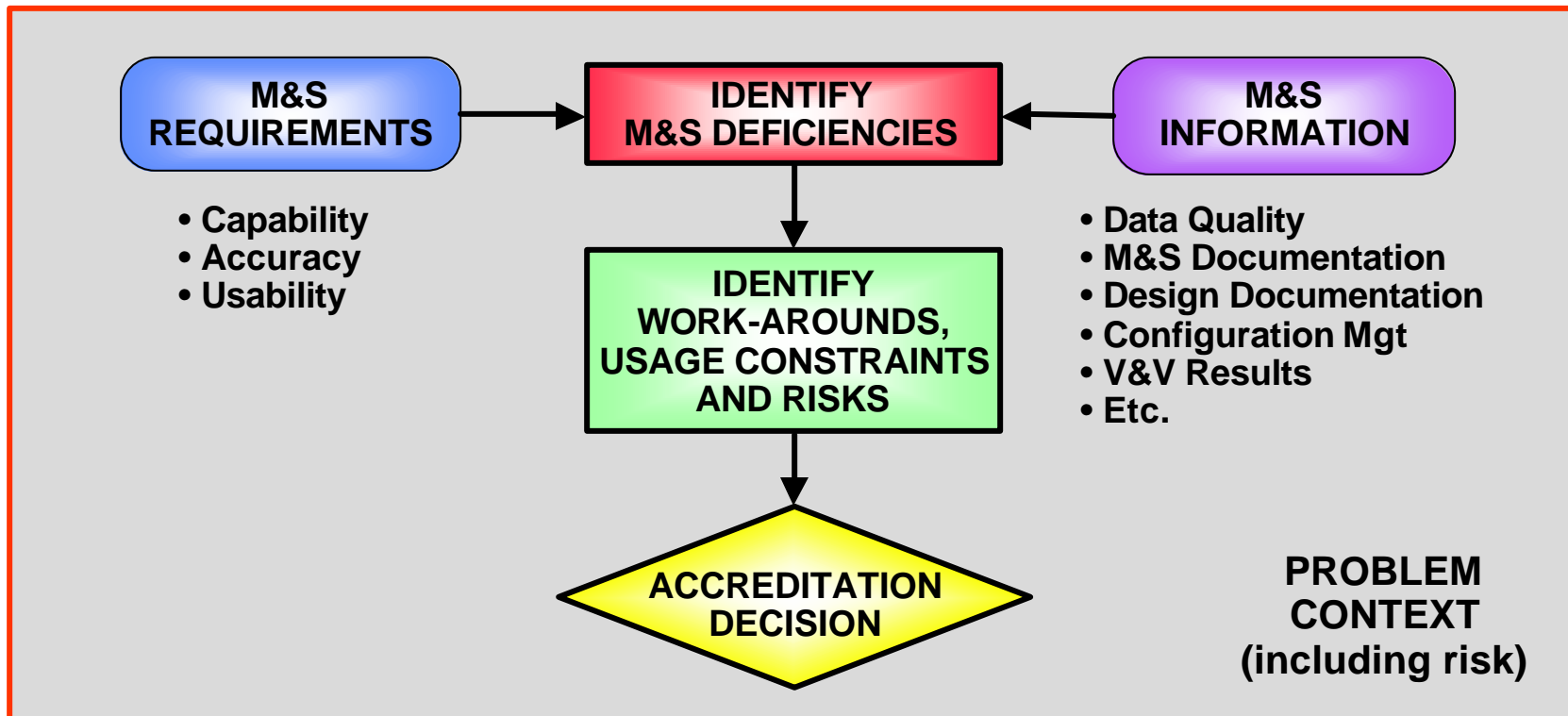**Dr. Paul R. Muessig**
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What Is Accreditation?

PROVING THE M&S IS SUITABLE FOR YOUR NEEDS

**REQUIRES AN OBJECTIVE COMPARISON
OF M&S INFORMATION WITH M&S REQUIREMENTS
DERIVED FROM THE CONTEXT OF THE PROBLEM**

M&S REQUIREMENTS

- Capability
- Accuracy
- Usability

IDENTIFY M&S DEFICIENCIES

M&S INFORMATION

- Data Quality
- M&S Documentation
- Design Documentation
- Configuration Mgt
- V&V Results
- Etc.

IDENTIFY WORK-AROUNDS, USAGE CONSTRAINTS AND RISKS

**ACCREDITATION DECISION**

PROBLEM CONTEXT (including risk)

Typical Accreditation Questions

➢ **What do I need the simulation to do?**

- Functional Requirements

➢ **How well do I need it to do those things?**

- Fidelity Requirements (level of detail)

➢ **How accurate do I need simulation to be?**

- Software

- Data

- Outputs

➢ **How credibly can I use the simulation?**

- Documentation

- Operators

- Analysts

- Training

What Makes a Simulation "Credible"?

JASA
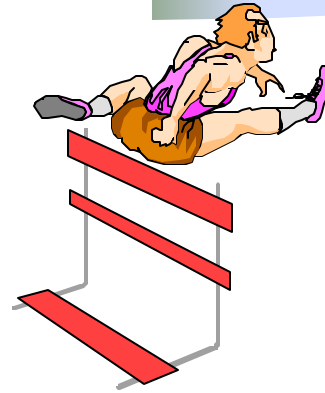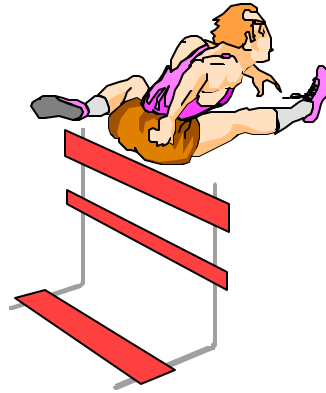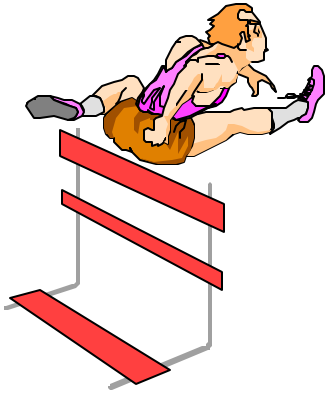
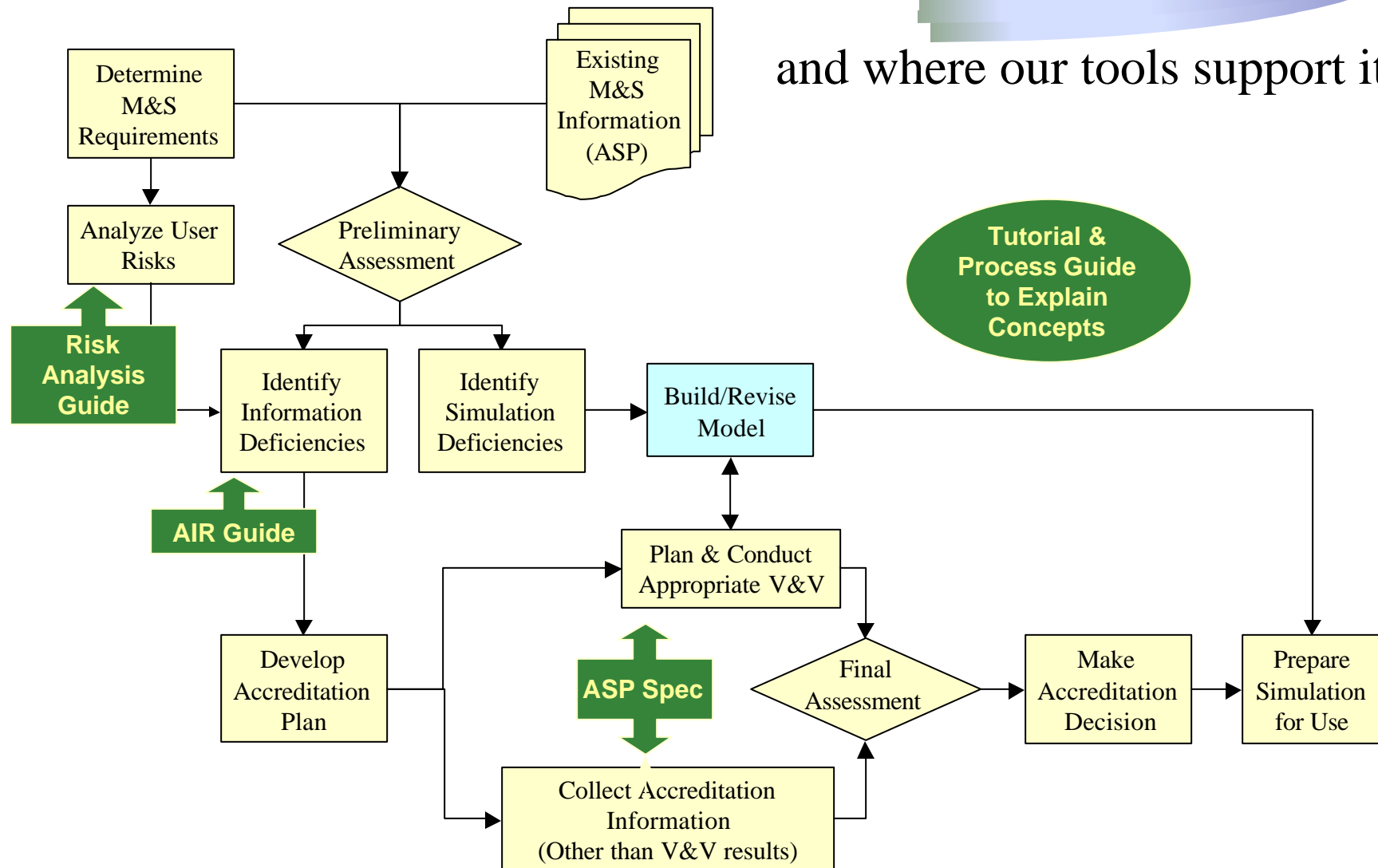| **Capability**		**Accuracy**		**Usability**		**Accreditation**
Simulation includes the right functions or objects (and interactions between them) at the right level of detail.	**+**	Software is error-free Data and data manipulations are accurate Outputs match the "real world"	**+**	Sufficient documentation and user support is available to support credible use of the simulation.	**=**	Simulation has been determined to have the required Capability, Accuracy and Usability necessary for use for a specific purpose.

Typical Focus

Generic Accreditation Process

and where our tools support it

```
Determine                    Existing
M&S                          M&S
Requirements                 Information
                             (ASP)

Analyze User    Preliminary
Risks           Assessment

Risk
Analysis        Identify        Identify       Build/Revise
Guide           Information      Simulation      Model
                Deficiencies    Deficiencies

        AIR Guide

Develop                         Plan & Conduct
Accreditation                   Appropriate V&V      Final         Make          Prepare
Plan            ASP Spec                            Assessment    Accreditation   Simulation
                                                                  Decision        for Use

                Collect Accreditation
                Information
                (Other than V&V results)
```

Tutorial &
Process Guide
to Explain
Concepts

User Tools

➢ **Accreditation Process Guide**

- Describes elements of accreditation process from requirements definition to accreditation assessment and documentation

➢ **Risk Assessment Guide**

- Tables of criteria to determine level of risk to user resulting from use of possibly erroneous simulation outputs or predictions

➢ **Accreditation Information Requirements (AIR) Guide**

- Used to identify nature, scope and depth of V&V and other information needed to accredit a simulation based on risks defined using guide described above

➢ **Accreditation Support Package (ASP) Specification**

- Provides format and content guidelines for documenting essential information needed by most users to make "good" accreditation assessments
  - V&V Results, Data quality info, model characterization & management information
- Structured by credibility components described previously

➢ **Accreditation Tutorial**

- Describes how to use tools above to make a "good" accreditation assessment
- Includes Lessons Learned and Annotated Examples

Accreditation Process Guide

➤ **Purpose**

- Provides M&S user with risk-based, information-oriented approach to establishing simulation credibility for accreditation

➤ **Description**

- Summary explanation of each step in the accreditation process, with hyperlinks to detailed descriptions of complex or interrelated steps
- Similar in concept to DMSO VV&A RPG or Navy VV&A Handbook, <u>but</u>
  - focuses on end-user accreditation, <u>not</u> simulation development

➤ **Status**

- Process-oriented guide currently available
- Information-oriented guide and descriptions currently distributed between tutorial and various plans or documents
- Will be updated and consolidated into single document this fiscal year

Risk Assessment Guide

➢ **Purpose**

- Assists M&S user to determine level of risk that could result from using erroneous M&S outputs

➢ **Description**

- Includes tables of criteria for assigning impact and probability levels for each specific risk element

- Also includes tables for determining overall risk level based on impact levels and probability of occurrence for each risk element

➢ **Status**

- Explanation is documented in tutorial and published papers

- Tables of criteria are published and have been used

- Will be incorporated into the Accreditation Process Guide as a hyperlinked utility

AIR Guide

➢ Purpose

- Assists M&S user to determine nature, scope, and depth of V&V and other information that is needed to establish credibility for an application with a known level of risk

➢ Description

- Six different matrices, one for each of the five elements of credibility plus one for requirements

➢ Status

- Documented in a published paper (SCSC 2000)
- Updated and validated by team of VV&A SMEs
- Tested successfully in AIM-9X accreditation planning for LRIP

ASP Specification

➢ **Purpose**

- Provides M&S user with a description of the format and content for V&V information needed for an accreditation assessment

➢ **Description**

- Includes documentation guidance for
  - Accreditation Plans and Reports
  - V&V Plans and Reports
  - Accreditation Letters
- Identifies the critical elements that should be presented or highlighted in accreditation assessments

➢ **Status:**

- Draft given to AF/XOC as guide for documenting AFSAT M&S
- Will be finalized by June, 2001
- Easily broadened to address more generic sets of M&S

Tutorial

➤ **Purpose**

- Provides on-line or on-site training in using accreditation methods and tools described in Process Document
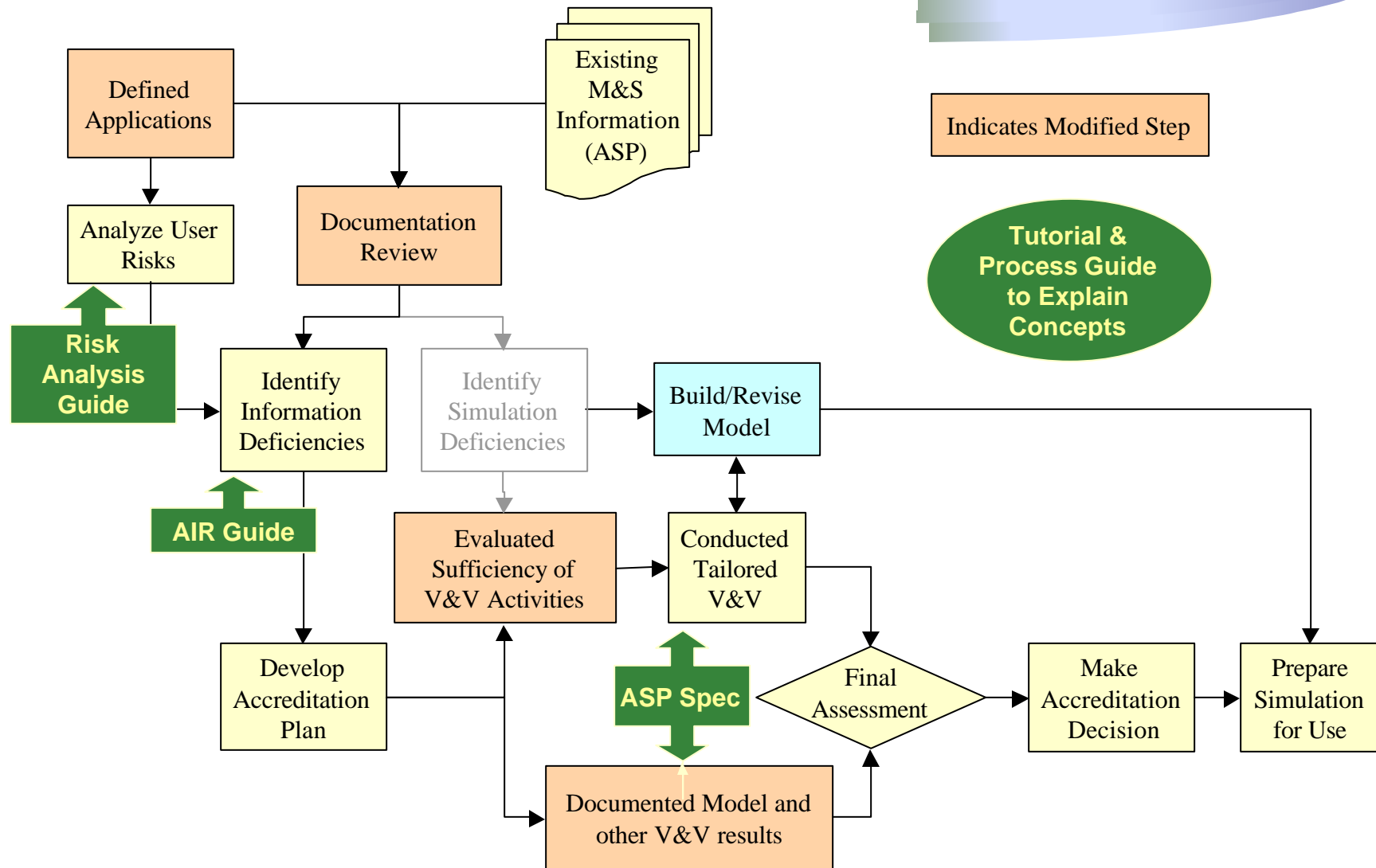
➤ **Description**

- Set of annotated viewgraphs that have been used in various venues to acquaint audiences with accreditation methodology
- Experienced personnel are also available to present tutorial

➤ **Status**

- Living entity that has been used and has evolved over past 4 years to reflect lessons learned in accreditation activities
- Current version reflects current risk-based, information-oriented accreditation process
- Annotation of current version planned for this FY

Example of Use - AIM-9X

```
Defined
Applications

Existing
M&S
Information
(ASP)

Indicates Modified Step

Tutorial &
Process Guide
to Explain
Concepts

Analyze User
Risks

Documentation
Review

Risk
Analysis
Guide

Identify
Information
Deficiencies

Identify
Simulation
Deficiencies

Build/Revise
Model

AIR Guide

Evaluated
Sufficiency of
V&V Activities

Conducted
Tailored
V&V

Develop
Accreditation
Plan

ASP Spec

Final
Assessment

Make
Accreditation
Decision

Prepare
Simulation
for Use

Documented Model and
other V&V results
```

Summary

➤ **Accreditation requires:**

- An assessment of simulation capability, accuracy, and usability
- A logical process that generates sufficient evidence of credibility

➤ **JASA has developed tools to support this process**

- Risk Analysis Guide
- Accreditation Information Requirements Guide
- Accreditation Support Package Specification
- Process description and Tutorial

Near-Term Plans and Proposal

➤ **Integrate toolset elements into an "Accreditation Assistant"**

- Via a Graphical User Interface
- Employing an interactive process chart with hyperlinks to process descriptions, tutorial sections, documentation templates, risk analysis process and matrices
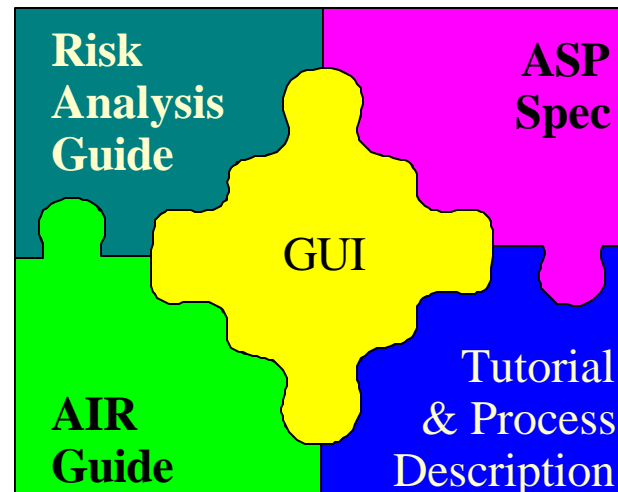
➤ **Proposals:**

- Integrate Accreditation Support Package Spec and Navy VV&A Turbo Tool
- Integrate Accreditation Assistant into Navy VV&A Handbook